Patent claims

1. A system for computer-aided handling and management of a numerically controlled industrial processing machine, having the following features:
   - a main computer (host 8) to produce and provide machine-related data and/or services and
   - a machine-side working computer (client 21), which is connected to the main computer via a data communication link (14) and by means of which (client) machine state data can be acquired in real time and transmitted to the main computer and by means of which machine-related data and/or services generated by the main computer as a function of such machine state data can be received by means of an analysis and evaluation unit.

2. The system for computer-aided handling and management as claimed in claim 1, the main computer having a communication link to a higher-order computer system of a machine manufacturer or manufacturer of machine components, via which access to system data of the main computer can be granted to the higher-order computer system by the main computer.

3. The system for computer-aided handling and management as claimed in claim 1 or 2, the machine-side working computer (client) having a unique identification means (I) with respect to the main computer (host), in particular an identification code, via which (I) the main computer (host) associates machine state data received from this working computer with this working computer.

4. The system for computer-aided handling and management as claimed in claim 1, 2 or 3, the data communication link between the main computer (host) and the working computer (client) being a connection via an

Internet or Intranet.

5. The system for computer-aided handling and management as claimed in claim 4, it being possible for the determination of machine state data on the part of the working computer (client) to be controlled via instructions received from the main computer (host) via the Internet or Intranet.

6. The system for computer-aided handling and management as claimed in claim 5, via which Internet pages or Intranet pages for the user-aided selection of options provided therein can be transmitted from the main computer (host) to the working computer (client).

7. A method for computer-aided production and provision of machine-related data and/or services for a numerically controlled industrial processing machine, a main computer (host) and a machine-side working computer (client) communicating via a data communication link, having the following method steps:
   - acquisition of machine state data on the part of the working computer (client),
   - transmission of the acquired machine state data via the data communication link to the main computer (host),
   - production of machine-related data and/or services on the part of the main computer (host) as a function of such machine state data and
   - provision of these machine-related data and/or services to the working computer (client) or its user.

8. The method for computer-aided production and provision of machine-related data and/or services as claimed in claim 7, machine state data being acquired in real time on the part of the working computer (client).

9. The method for computer-aided production and provision of machine-related data and/or services as claimed in claim 7 or 8, a unique

identification means (I), in particular an identification code, associated with the machine-side working computer (client) being transmitted to the main computer (host).

10. The method for computer-aided production and provision of machine-related data and/or services as claimed in claim 9, the main computer (host) associating machine state data received from a working computer with this working computer by using the identification means (I).

11. The method for computer-aided production and provision of machine-related data and/or services as claimed in one of the preceding claims 7 to 10, the machine state data comprising program data or servo data or motor data or converter data or position data or sensor data.

12. The method for computer-aided production and provision of machine-related data and/or services as claimed in one of the preceding claims 7 to 11, the working computer (client) buffering the acquired machine state data in a storage means before said data are transmitted to the main computer (host).

13. The method for computer-aided production and provision of machine-related data and/or services as claimed in claim 12, machine state data stored in the storage means being transmitted via the data communication link to the main computer (host) under time control or event control.

14. The method for computer-aided production and provision of machine-related data and/or services as claimed in one of the preceding claims 7 to 13, automatic analysis or evaluation of received machine state data being carried out on the part of the main computer (host).

15. A method of creating a database with machine-related data for a

plurality of industrial processing machines, a common main computer (host) performing computer-aided production and provision of machine-related data and/or services as claimed in one of the preceding claims 10 to 14 for a plurality of working computers (clients) associated with the industrial processing machines, a data set with the machine state data from one of the working computers (clients) being generated in a storage means and the unique identification code associated with this working computer being determined, and an item of information corresponding to the identification code being appended to the data set.

16. A method for computer-aided provision of machine-related data and/or services from a main computer of a service provider to a working computer of a processing machine of a customer via a network, in particular as claimed in one of the preceding claims 7 to 15, the working computer of the processing machine of the customer having a system for the control and/or monitoring of the processing machine and a suitable sensor for acquiring machine state data and being connected to the network, having the following method steps:

- transmission of information relating to the availability of machine-related data and/or services from the main computer to the working computer,

- receipt of a request for machine-related data and/or a service from the working computer on the part of the main computer,

- transmission of information with reference to requisite machine state data to be acquired by the working computer from the main computer to the working computer,

- receipt of data from the working computer containing the requisite machine state data on the part of the main computer,

- generation of the machine-related data requested by the working computer and/or the requested service by the main computer and

- transmission of the machine-related data requested by the working computer and/or the requested service from the main computer to the

working computer.

17. The method for computer-aided provision of machine-related data and/or services from a main computer of a service provider to a working computer of a processing machine of a customer via a network as claimed in claim 16, the main computer receiving and storing information with respect to a payment for requested machine-related data and/or services from the working computer.

18. The method for computer-aided provision of machine-related data and/or services as claimed in claim 16 or 17, in particular for computer-aided provision of services for optimization purposes, having the following further method steps:
   - generation of a data structure to accommodate data with reference to a service,
   - storage of first data in the data structure, which represent the identity of a customer, in particular of the unique identification code, and
   - storage of further data in the data structure, which represent the identity of the service.

19. The method for computer-aided provision of machine-related data and/or services as claimed in claim 18, in particular for computer-aided provision of services for optimization purposes, having the following further method steps:
   - determination of measured data with reference to the service provided to the customer and
   - storage of further data in the data structure, which represent these measured data.

20. The method for computer-aided provision of machine-related data and/or services as claimed in one of claims 17 to 19, having the following further method steps for registering price information for

payment:

\-   determination of a first item of price information as fixed costs of a predetermined repeated time period, in particular a monthly time period,

\-   determination of a second item of price information as variable costs as a function of a service provided.

21.   An apparatus for computer-aided provision of machine-related data and/or services on a main computer of a service provider for a working computer of a processing machine of a customer via a network, in particular with a system for computer-aided handling and management of a numerically controlled industrial processing machine as claimed in one of the preceding claims 1 to 6, the working computer of the processing machine of the customer having a system for the control and/or monitoring of the processing machine and a suitable sensor (16) for acquiring machine state data and being connected to the network, having the following further features on the part of the main computer:

\-   a means for transmitting

   \-   information relating to the availability of machine-related data and/or services from the main computer to the working computer and

   \-   information with reference to requisite machine state data to be acquired by the working computer from the main computer to the working computer and

   \-   the machine-related data requested by the working computer and/or the requested service from the main computer to the working computer and

\-   a means for the receipt

   \-   of a request for machine-related data and/or a service from the working computer on the part of the main computer and

   \-   of data from the working computer containing the requisite machine state data on the part of the main computer and

\-   a means for generating the machine-related data requested by the

working computer and/or the requested service by the main computer.

22.   The apparatus for computer-aided provision of machine-related data and/or services on a main computer of a service provider as claimed in claim 21, the means for generating the machine-related data requested by the working computer and/or the requested service by means of the main computer comprising an Internet web server and the main computer being suitably programmed to use it to produce Internet web pages.

23.   The apparatus for computer-aided provision of machine-related data and/or services on a main computer of a service provider as claimed in claim 21 or 22, the working computer of the customer having a unique identification means, in particular an identification code, for the processing machine, and the main computer having a storage means, in particular a database, to accommodate information from the working computer in conjunction with the identification code.

24.   An apparatus for computer-aided provision of services for an automation system via a network, in particular with a system for computer-aided handling and management of a numerically controlled industrial processing machine as claimed in one of the preceding claims 1 to 6 or 21 to 23, having the following features:
    -    a means (22) for loading instructions (24, 25) onto the automation system, the instructions controlling at least one function or another aspect of the automation system,
    -    a means (23) for receiving customer-related system data from the automation system via the network, such system data being collected as a function of the loaded instructions,
    -    a means for generating suitable services for the automation system as a function of the collected customer-related system data and
    -    a means for transmitting such services to the automation system of

the customer via the network.

25.	The apparatus for computer-aided provision of services for an automation system via a network as claimed in claim 24, having a means for providing a selection of options of the service to the automation system of the customer via the network.

26.	The apparatus for computer-aided provision of services for an automation system via a network as claimed in claim 25, having a means for selecting one of the options of the service on the part of the automation system of the customer.

27.	The apparatus for computer-aided provision of services for an automation system via a network, as claimed in one of the preceding claims 21 to 26, the automation system having a network interface for communication via the network and for receiving the service information, and a means (machine agent 22) being provided for generating machine-executable program sequences (24, 25) on the basis of the received services, the network interface and the means for generating machine-executable program sequences exchanging data via a predefined data format.

28.	The apparatus for computer-aided provision of services for an automation system via a network as claimed in claim 27, the network interface comprising an Internet browser (23).

29.	The use of a method for computer-aided production and provision of machine-related data and/or services as claimed in one of the preceding claims 9 to 20 for remote commissioning or remote maintenance of an industrial working machine.

30.	The use of a method for computer-aided production and provision of

machine-related data and/or services as claimed in one of the preceding claims 9 to 20 for carrying out a subset of the following measures:

- electronic measurement of workpieces, tools and clamping means for the diagnosis of problems in the event of deficient workpiece quality or for the dialog-guided correction of the relationships,

- indication of the relationships of process variables such as laser output, feed speed or tool rotational speed and feed speed,

- analysis of the tool paths in the Cartesian coordinate system, with correction or statements relating to a good part/poor part,

- monitoring of process variables with limiting value monitoring and/or correlation monitoring,

- program analysis by processing a program in a virtual simulation of the processing machine,

- automatic creation of commissioning logs for the seamless documentation of the commissioning state,

- automatic creation of service and maintenance logs for the seamless documentation of the machine history,

- evaluation for the diagnosis of exceptional and fault situations,

- saving and archiving configuration data, user data and programs for the reconstruction of states or for the detection of changes affected by problems.